FIG. 1A

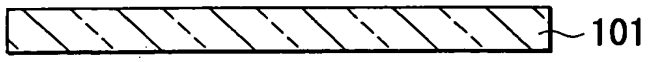


FIG. 1B

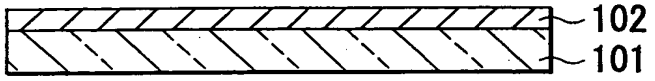


FIG. 1C

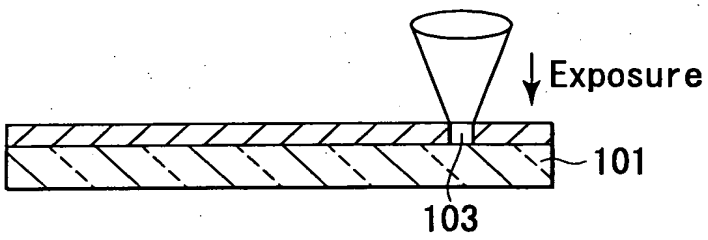


FIG. 1D

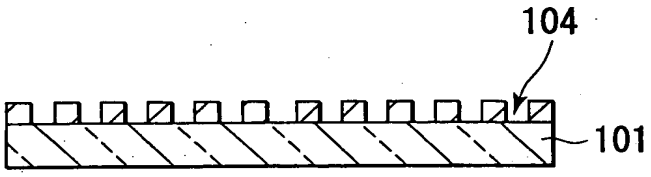


FIG. 1E

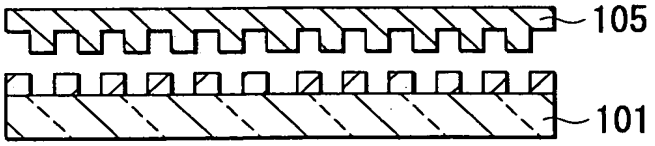


FIG. 2A

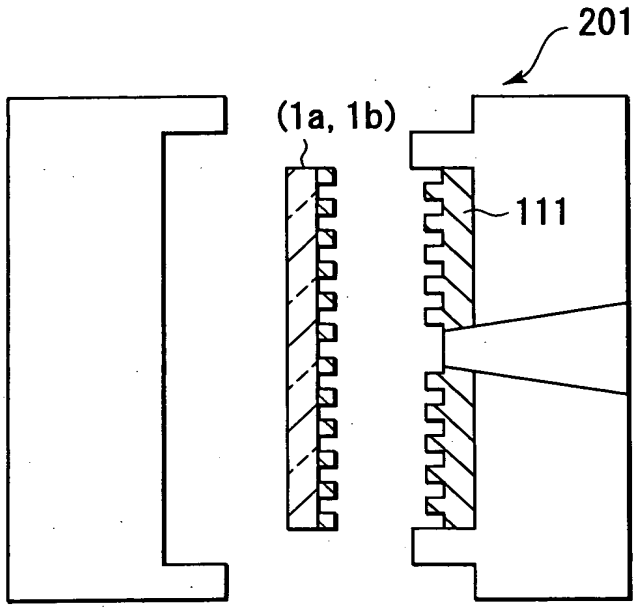


FIG. 2B

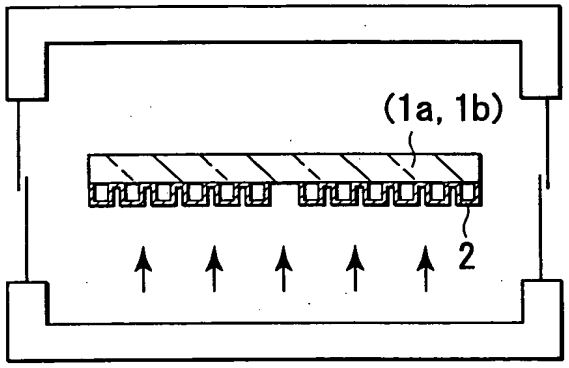
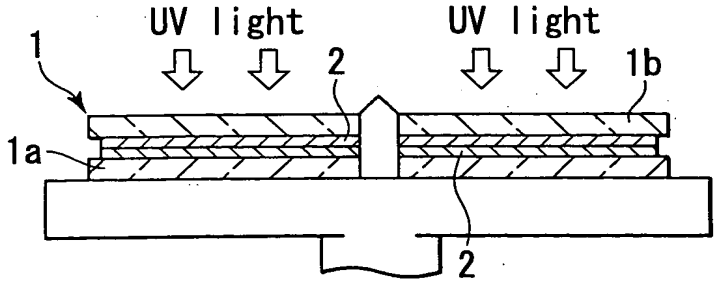


FIG. 2C



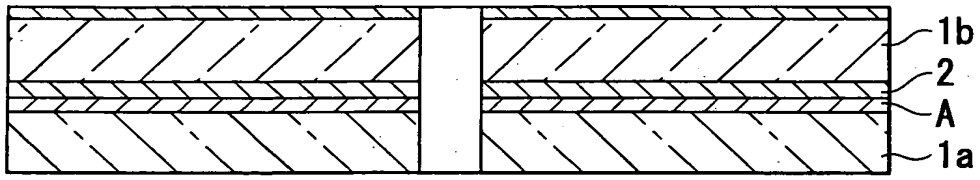


FIG. 3

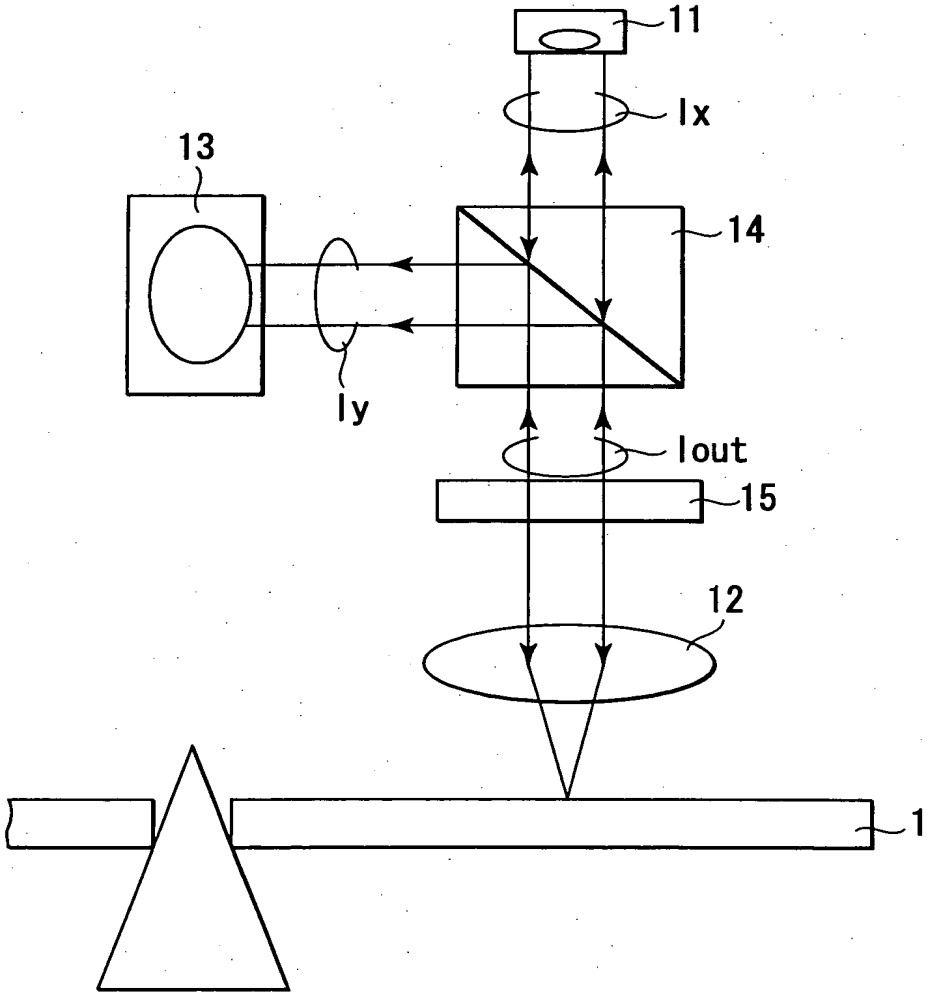


FIG. 4

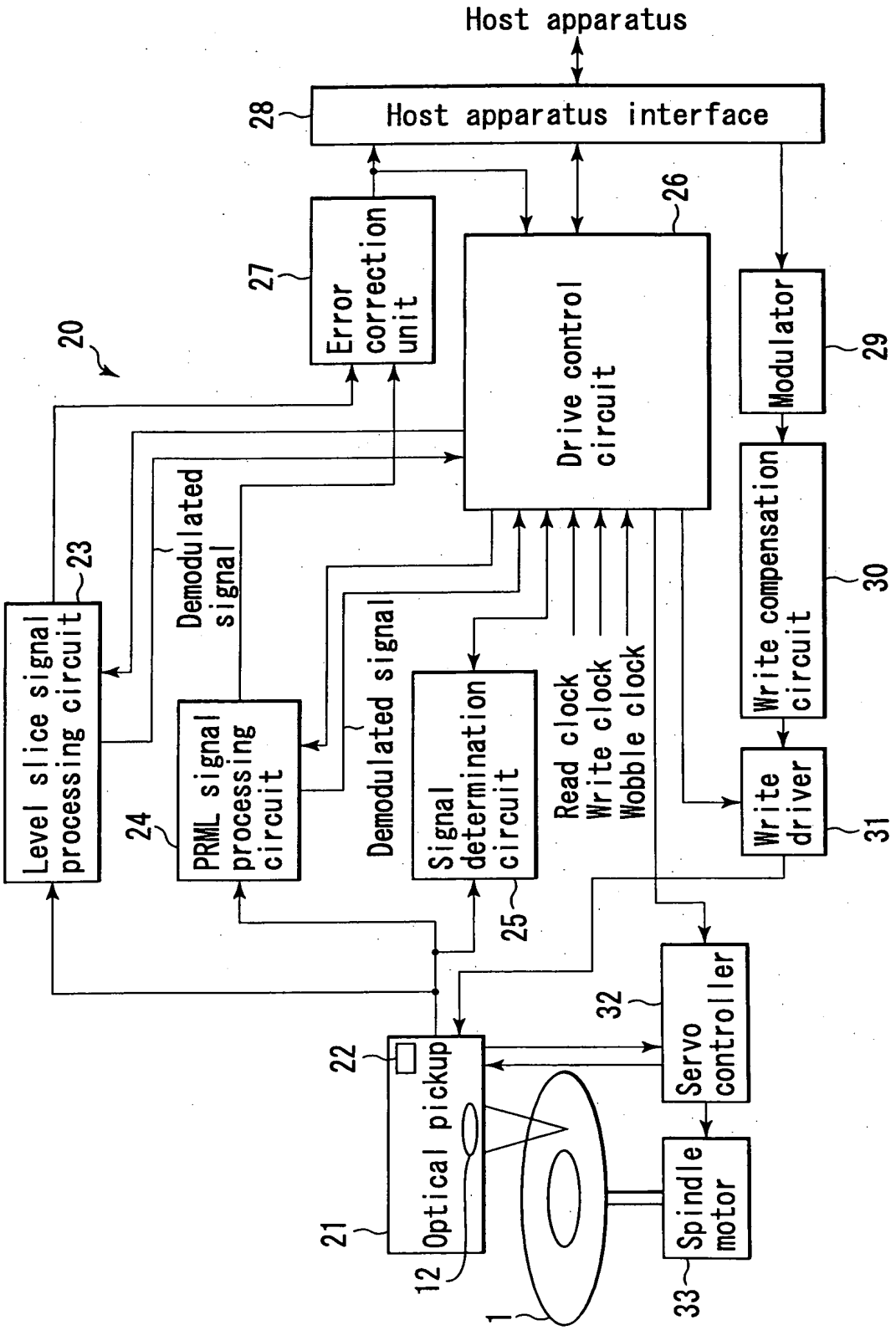

Host apparatus
28
Host apparatus interface
26
27
Error correction unit
Drive control circuit
Modulator
29
20
23
Level slice signal processing circuit
Demodulated signal
Demodulated signal
Write compensation circuit
30
24
PRML signal processing circuit
Signal determination circuit
Read clock
Write clock
Wobble clock
Write driver
31
25
32
Servo controller
22
Optical pickup
Spindle motor
21
12
1
33

FIG. 5

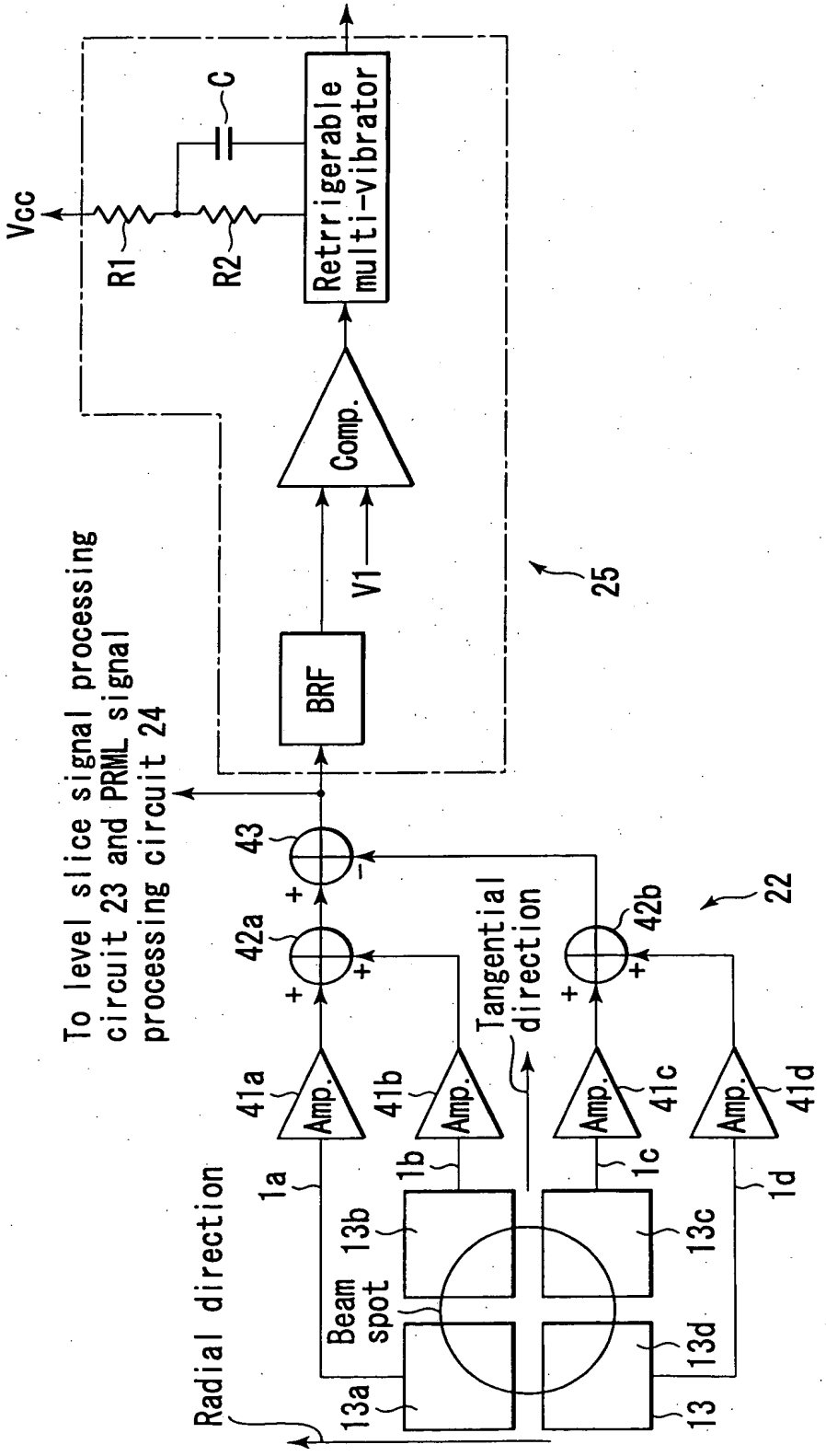

Vcc
R1
R2
C
Retrrigerable multi-vibrator
Comp.
V1
BRF
25
To level slice signal processing circuit 23 and PRML signal processing circuit 24
43
42a
42b
22
Tangential direction
41a
41b
41c
41d
Amp.
1a
1b
1c
1d
Beam spot
13b
13c
13d
13a
13
Radial direction

FIG. 6

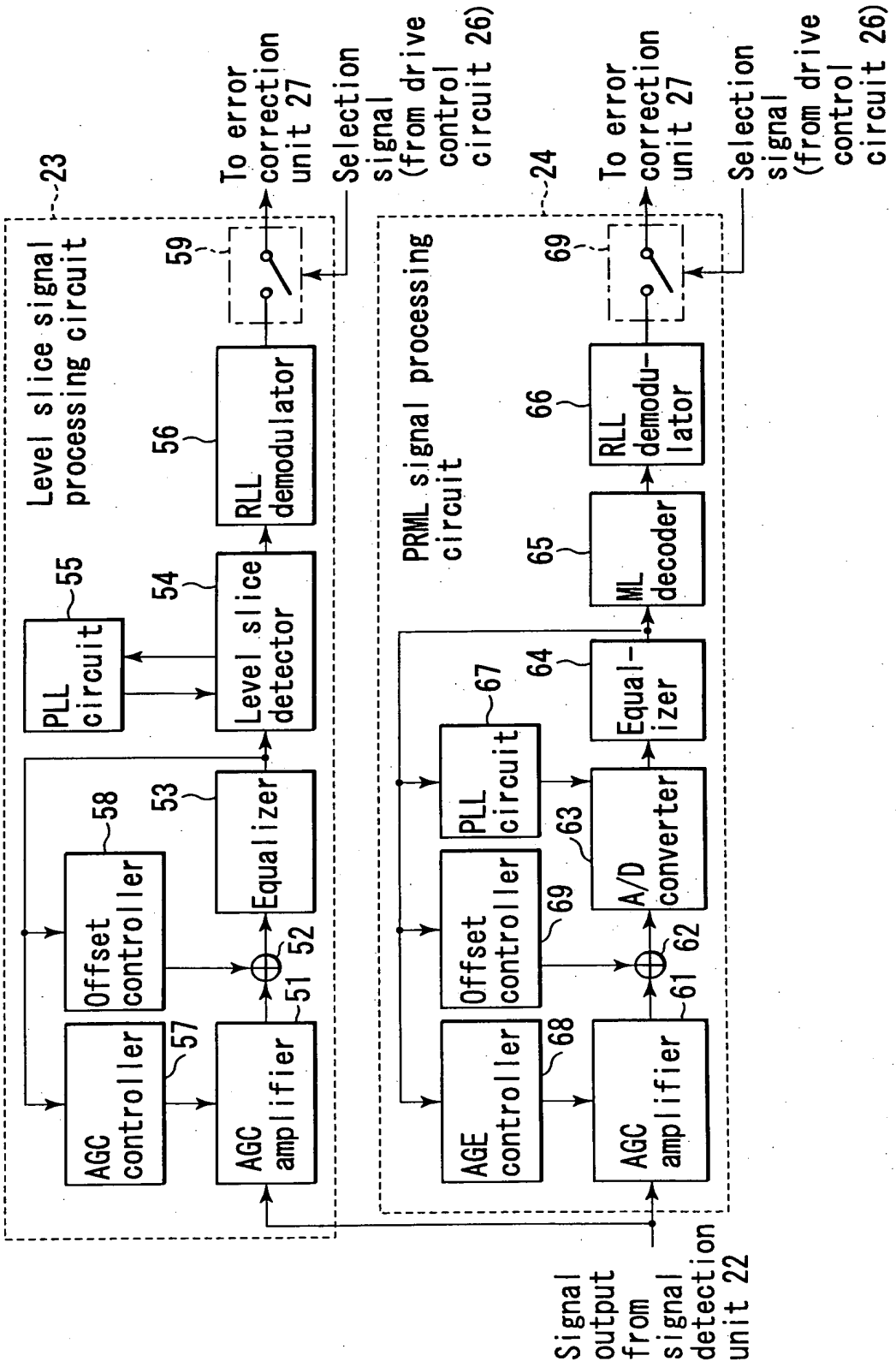

Level slice signal processing circuit
23
AGC controller
57
AGC amplifier
51
52
Offset controller
58
Equalizer
53
PLL circuit
55
Level slice detector
54
RLL demodulator
56
59
To error correction unit 27
Selection signal (from drive control circuit 26)
PRML signal processing circuit
24
AGE controller
68
AGC amplifier
61
62
Offset controller
69
PLL circuit
67
A/D converter
63
Equal-izer
64
ML decoder
65
RLL demodu-lator
66
69
To error correction unit 27
Selection signal (from drive control circuit 26)
Signal output from signal detection unit 22

FIG. 7

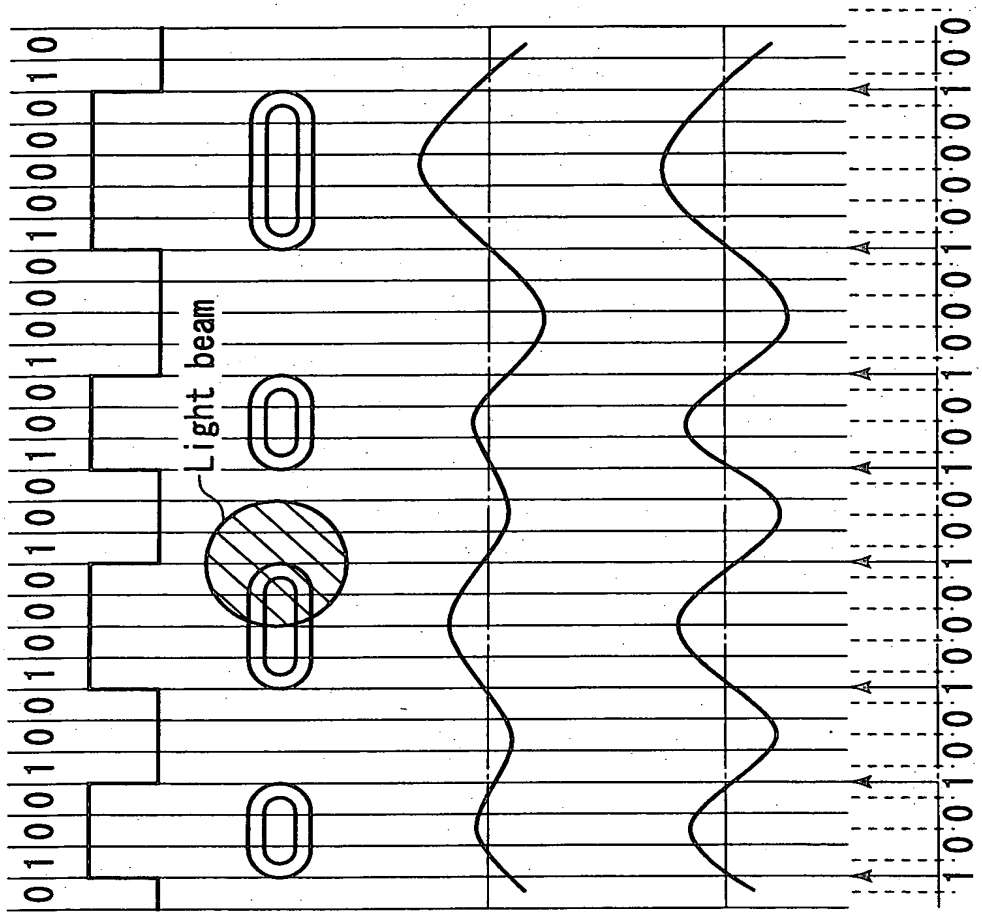
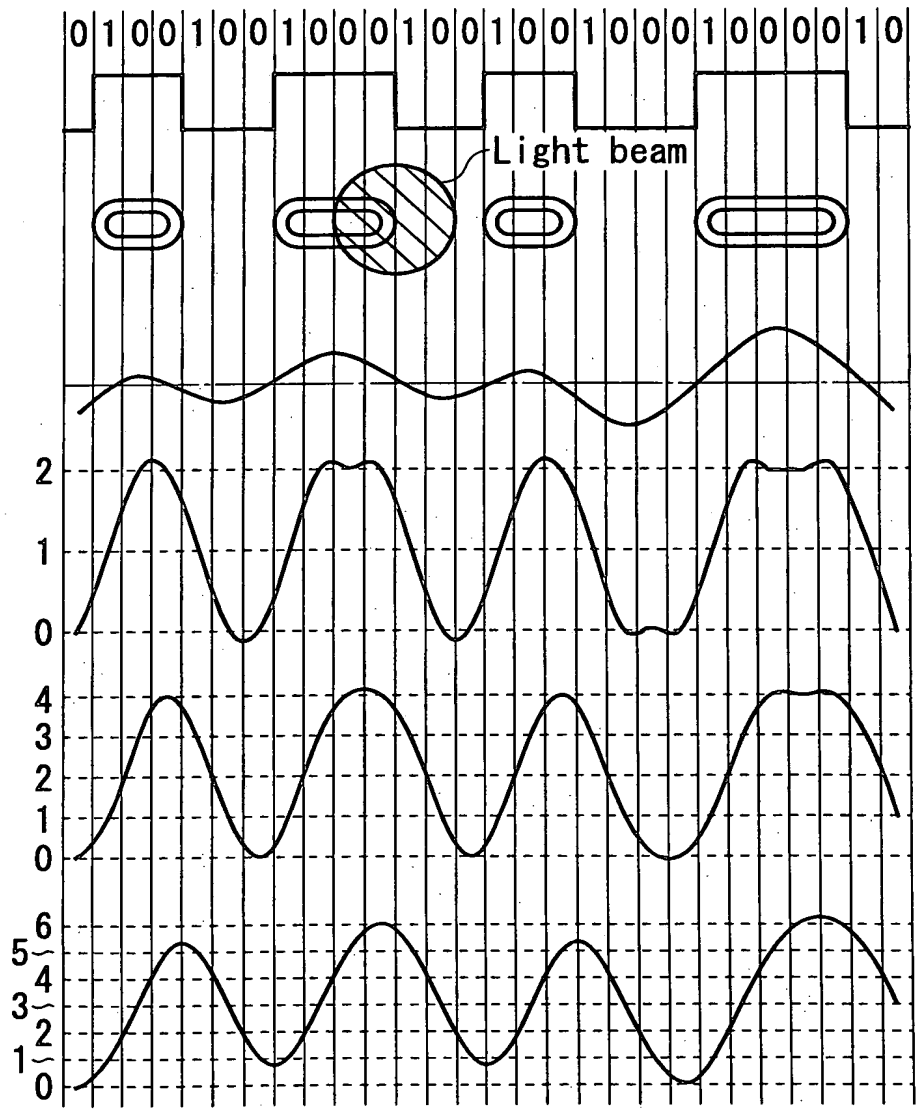


FIG. 8A
FIG. 8B
FIG. 8C
FIG. 8D
FIG. 8E
FIG. 8F

FIG. 9A
FIG. 9B
FIG. 9C
FIG. 9D
FIG. 9E
FIG. 9F
FIG. 9G



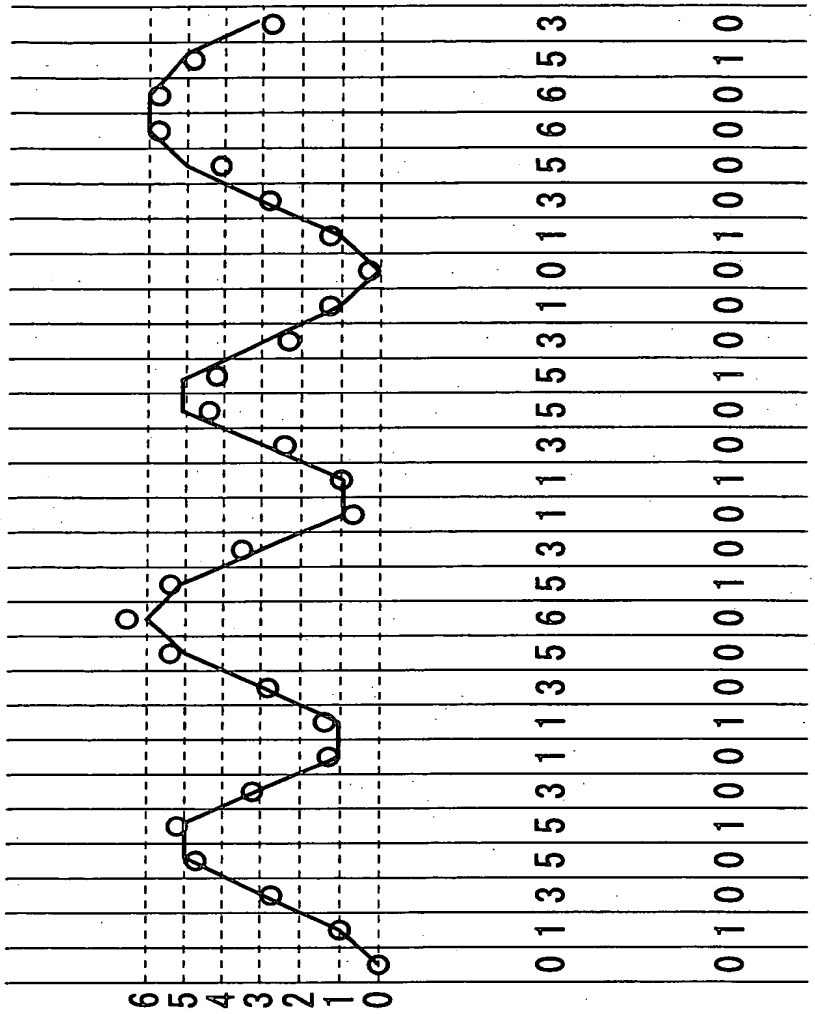


FIG. 10A

FIG. 10B

FIG. 10C

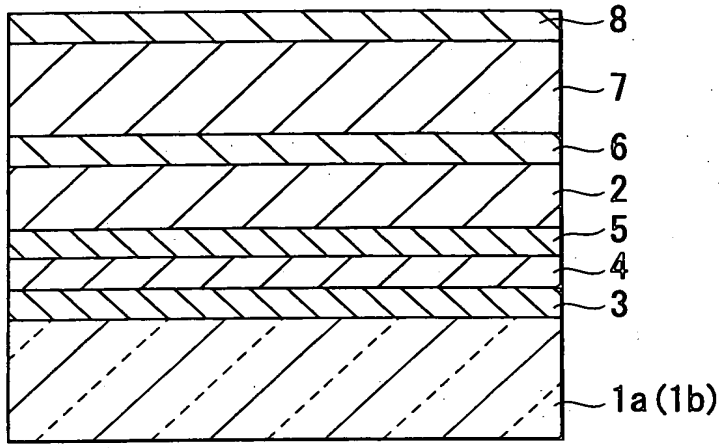


FIG. 11

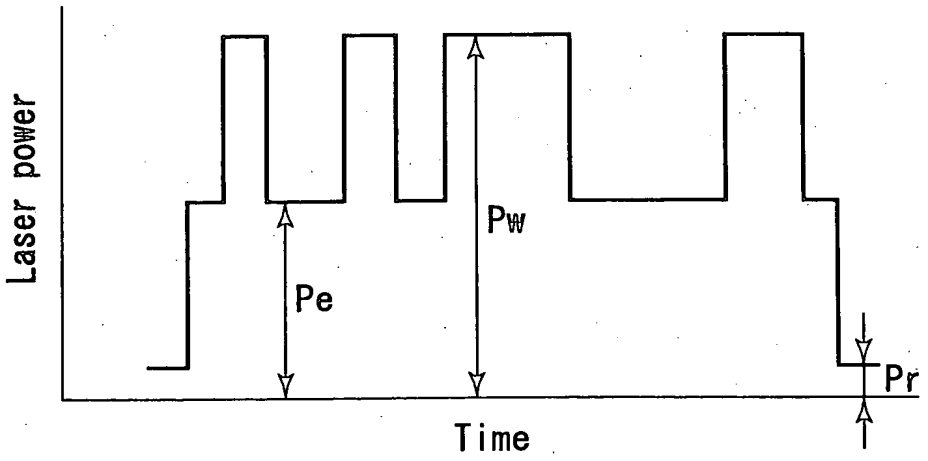


FIG. 12

View explaining data structure of lead-in area in reproduction-only information recording medium

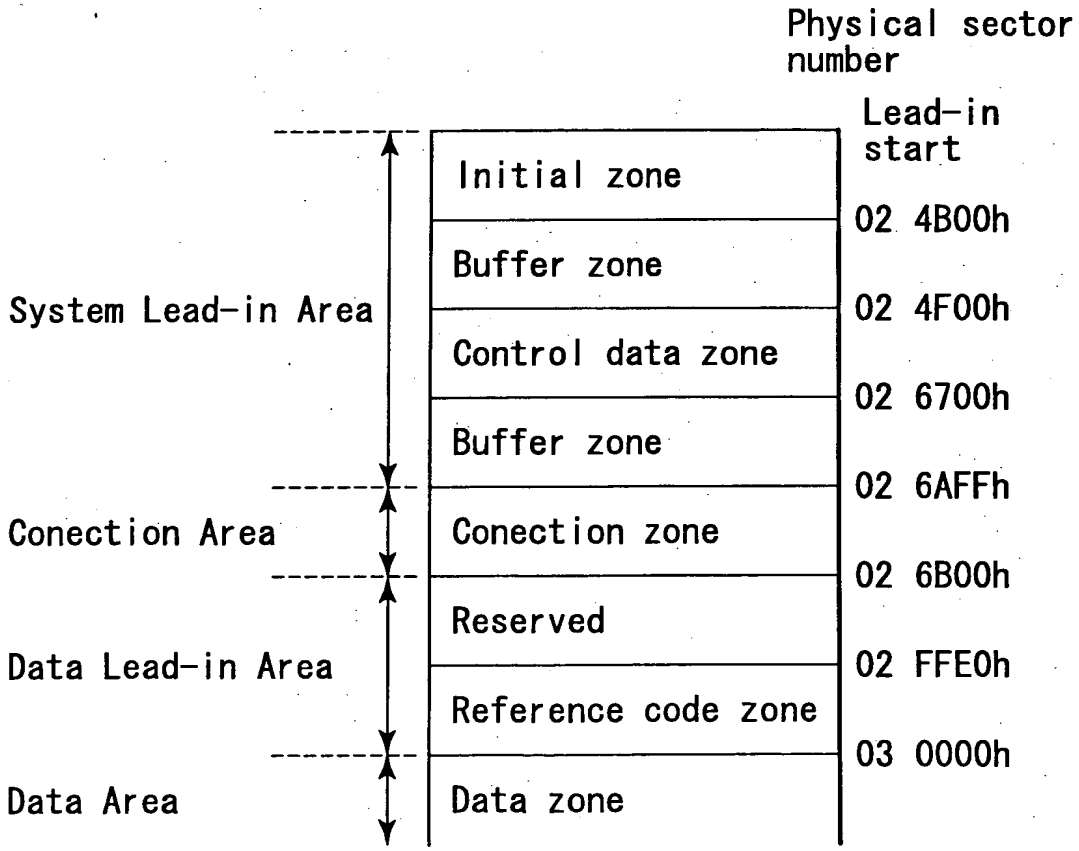


FIG. 13

FIG. 14A

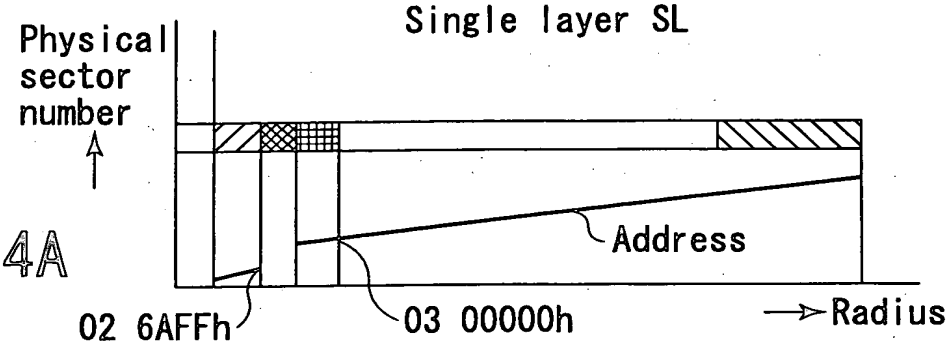


FIG. 14B

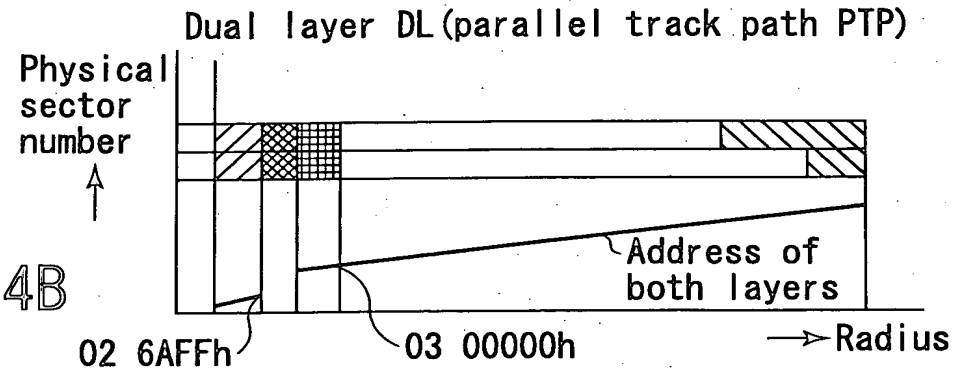
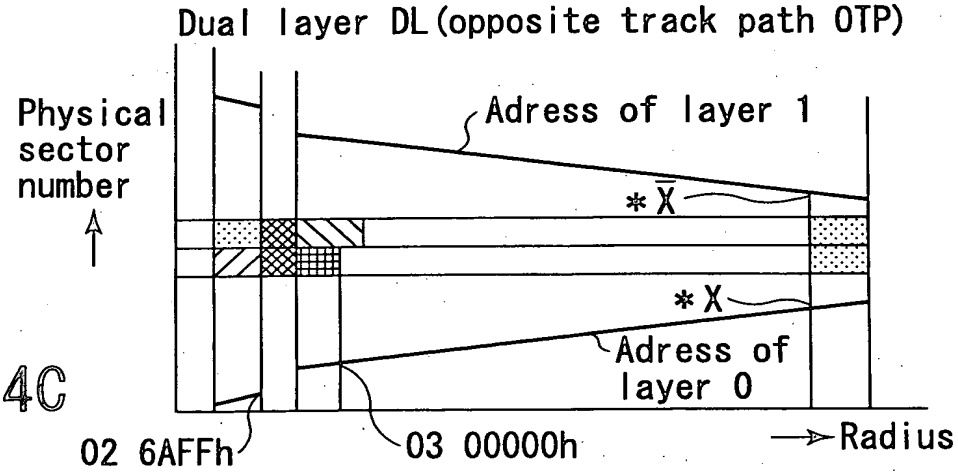


FIG. 14C



: Data area
: System lead-in area
: Connection area
: Data lead-in area
: Middle area
: Data lead-out area
: System lead-out area

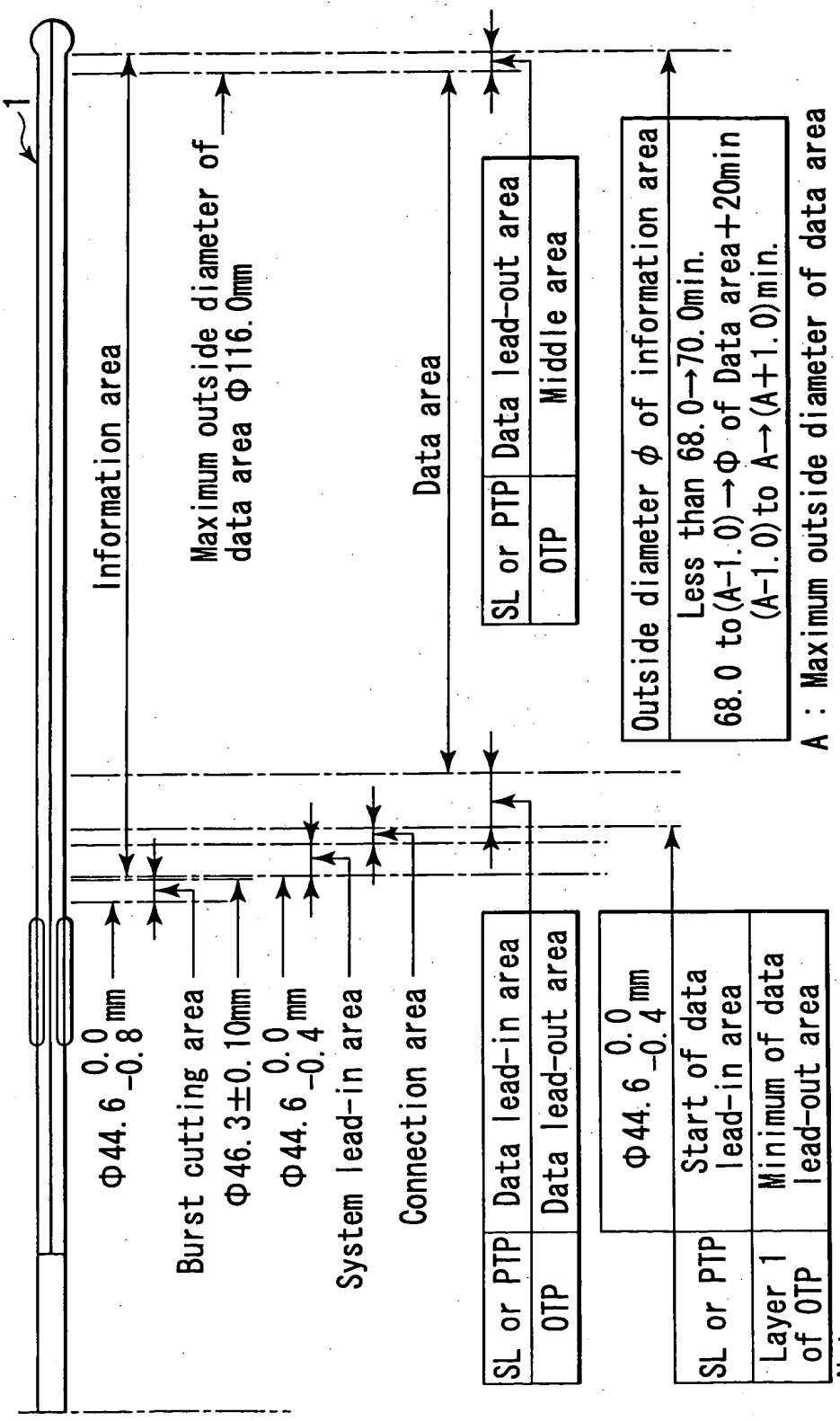

1
Information area
Maximum outside diameter of data area Φ116.0mm
Data area
Φ44.6 0.0 -0.8 mm
Burst cutting area
Φ46.3±0.10mm
Φ44.6 0.0 -0.4 mm
System lead-in area
Connection area
SL or PTP
OTP
Data lead-in area
Data lead-out area
SL or PTP
OTP
Data lead-out area
Middle area
Φ44.6 0.0 -0.4 mm
SL or PTP
Layer 1 of OTP
Start of data lead-in area
Minimum of data lead-out area
Outside diameter φ of information area
Less than 68.0→70.0min.
68.0 to(A-1.0)→Φ of Data area+20min
(A-1.0)to A→(A+1.0)min.
A : Maximum outside diameter of data area
Note :
SL : Single layer
PTP : Parallel track path
OTP : Oposite track path

FIG. 15

Table explaining recorded data density of respective regions in reproduction-only information recording medium of the present invention

Parameter		Single layer	Dual layer
· User data capacity		15 Gbytes/side	30 Gbytes/side
· Wavelength of laser diode		405 nm	
· Numerical aperture of objective lens		0.65	
· Data bit length	System lead-in area	0.306 μm	
	Data lead-in area Data area Data lead-out area	0.153 μm	
· Channel bit length	System lead-in area	0.204 μm	
	Data lead-in area Data area Data lead-out area	0.102 μm	
· Minimum mark length	System lead-in area	0.408 μm	
	Data lead-in area Data area Data lead-out area	0.204 μm	
· Maximum mark length	System lead-in area	2.652 μm	
	Data lead-in area Data area Data lead-out area	1.326 μm	
· Track pitch	System lead-in area	0.68 μm	
	Data lead-in area Data area Data lead-out area	0.40 μm	
· Disc diameter		120 mm	
· Disc thickness		1.20 mm	
· Cover layer thickness		0.6 mm	
· Central hole diameter		15.0 mm	
· Data area inside diameter		24.1 mm	
· Data area diameter		58.0 mm	
· User data/sector		2048 bytes	
· Error correction code		Leas Solomom product signal	
· ECC restriction sector		RS(208, 192, 17) × RS(182, 172, 11)	
· Modulation		32 sectors	
		ETM, RLL(1, 10)	
· Correctable burst error length		7.1 mm	
· Reference scan speed		6.61 m/s	
· Channel bit rate to reference speed	System lead-in area	32.40 Mbps	
	Data lead-in area Data area Data lead-out area	64.80 Mbps	
· User bit rate to reference speed	System lead-in area	18.28 Mbps	
	Data lead-in area Data area Data lead-out area	36.55 Mbps	

FIG. 16

View explaining data arangement in control data zone of reproduction-only/write-once type/rewritable type information recording medium

Physical format information
Disc manufacturer's information
Reservation

FIG. 17

View explaining contents of information in physical format reproduction-only information recording medium

BP	Contents	Number of bytes
0	Type of specification and type of part	1bytes
1	Disc size and maximum transfer speed of disc	1bytes
2	Disc structure	1bytes
3	Recording density	1bytes
4 to 15	Data area allocation	12bytes
16	BCA adapter	1bytes
17 to 2047	Reseration	2031bytes

FIG. 18

(BP 0) Type of specification and type of part

b7	b6	b5	b4	b3	b2	b1	b0
Type of specification				Type of part			

FIG. 19

(BP 1) Disc size and maximum transfer speed of disk

b7	b6	b5	b4	b3	b2	b1	b0
Disc size				Maximum transfer speed of disk			

FIG. 20

(BP 2) Disc structure

b7	b6	b5	b4	b3	b2	b1	b0
Reser-vation	Number of layers		Track path	Layer type			

FIG. 21

(BP 3) Recording density

b7	b6	b5	b4	b3	b2	b1	b0
Liner density				Track density			

FIG. 22

View explaining contents of data areallocation information in reproduction-only/write-once type/rewritable type information recording medium

BP	SL	PTP	OTP	Number of byte
4	00h			1bytes
5 to 7	Number of pysical sector at the start of data area (03 0000h)			3bytes
8	00h			1bytes
9 to 11	Number of pysical sector at the end of data area			3bytes
12	00h			1bytes
13 to 15	00 0000h		Number of pysical sector at the end of layer 0	3bytes

FIG. 23

(BP 16) BCA descriptor

b7	b6	b5	b4	b3	b2	b1	b0
BCA flag	Reservation						

FIG. 24

View explaining recorded data density in respective areas of rewritable type information recording medium

Parameter		Single layer
・User data capacity		20 Gbytes/side
・Wavelength of laser diode		405 nm
・Numerical aperture of objective lens		0.65
・Data bit length	System lead-in area	0.306 μm
	Data lead-in area Data area Data lead-out area	0.130 to 0.140 μm
・Channel bit length	System lead-in area	0.204 μm
	Data lead-in area Data area Data lead-out area	0.087 to 0.093 μm
・Minimum mark length(2T)	System lead-in area	0.408 μm
	Data lead-in area Data area Data lead-out area	0.173 to 0.187 μm
・Maximum mark length(13T)	System lead-in area	2.652 μm
	Data lead-in area Data area Data lead-out area	1.126 to 1.213 μm
・Track pitch	System lead-in area	0.68 μm
	Data lead-in area Data area Data lead-out area	0.34 μm
・Physcial address	Data lead-in area Data area Data lead-out area	*WAP *WAP = Wobble Address in Periodic position (Cyclic Wobble address)
・Disc diameter ・Disc thickness ・Central hole diameter ・Data area inside diameter ・Data area diameter		120 mm 1.20 mm 15.0 mm 24.1 mm 57.89 mm
・User data/sector ・Error correction code ・ECC restriction sector ・Modulation		2048 bytes Leas Solomom product signal RS(208, 192, 17) × RS(182, 172, 11) 32 sectors ETM, RLL(1, 10)
・Correctable burst error length	System lead-in area	7.1 mm
・Reference scan speed	Data lead-in area Data area Data lead-out area	6.0 mm
	System lead-in area	6.61 m/s
	Data lead-in area Data area Data lead-out area	5.64 to 6.03 m/s
・Channel bit rate to reference speed	System lead-in area	32.40 Mbps
	Data lead-in area Data area Data lead-out area	64.80 Mbps
・User bit rate to reference speed	System lead-in area	18.28 Mbps
	Data lead-in area Data area Data lead-out area	36.55 Mbps

FIG. 25

View explaining data strucuture of lead-in area in rewritable type information recording medium

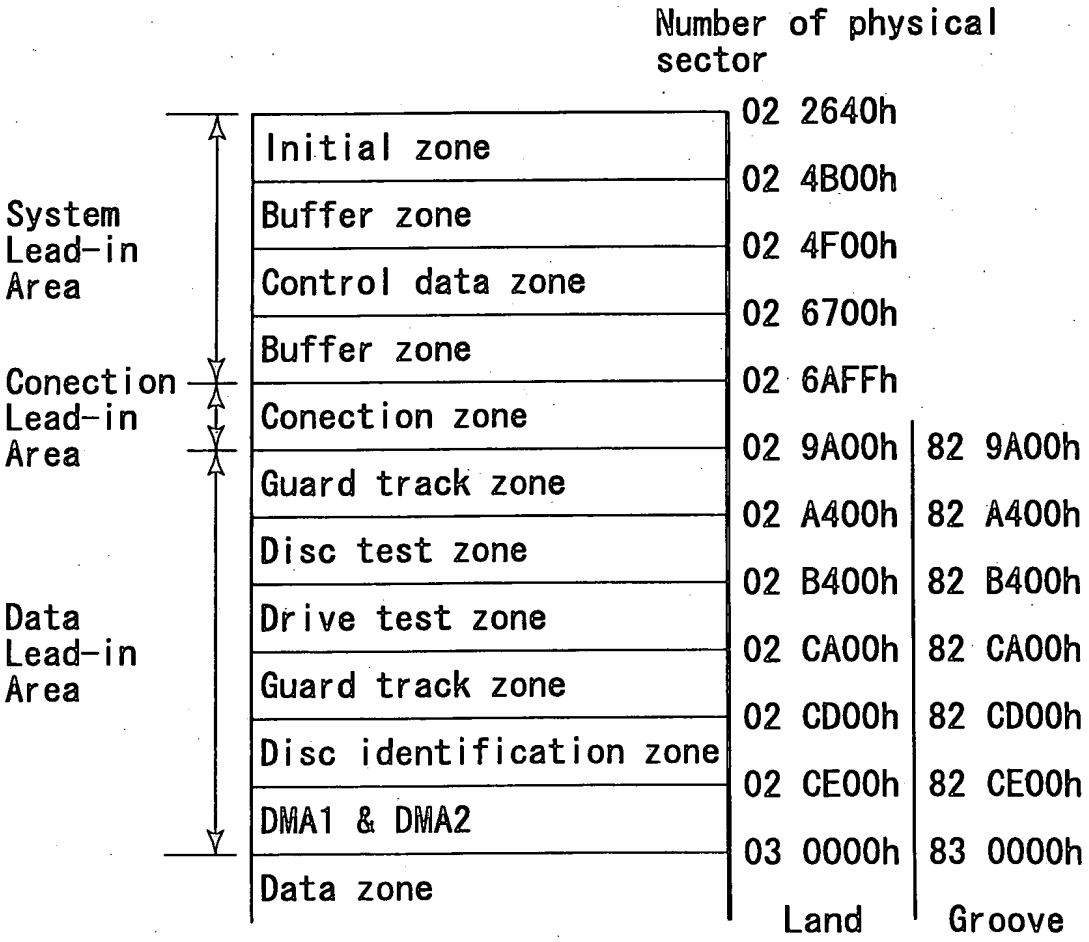


FIG. 26

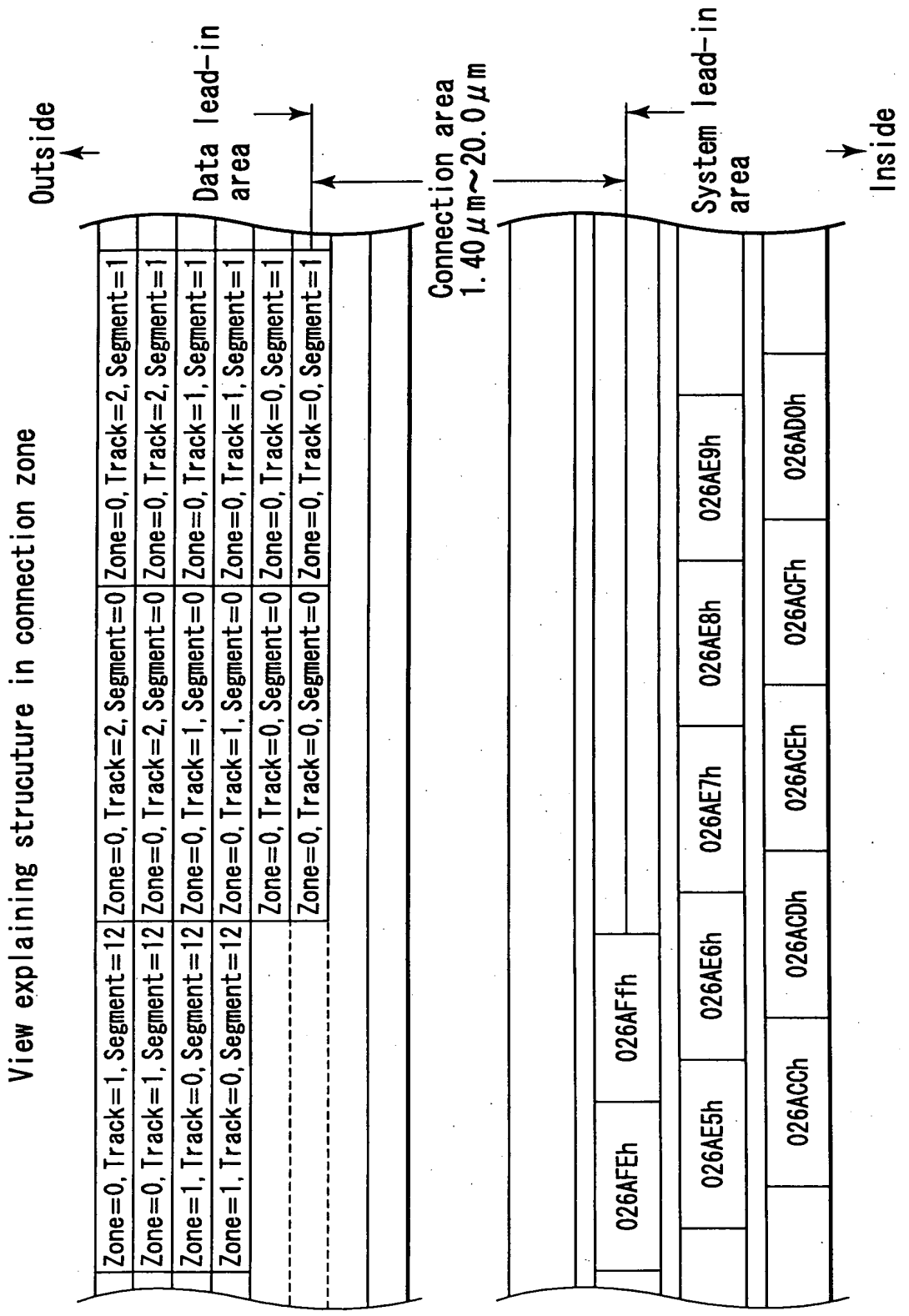

View explaining structure in connection zone
Outside
Data lead-in area
Connection area 1.40μm~20.0μm
System lead-in area
Inside
Zone=0, Track=1, Segment=12
Zone=0, Track=2, Segment=0
Zone=0, Track=2, Segment=1
Zone=1, Track=0, Segment=12
Zone=1, Track=1, Segment=0
Zone=1, Track=1, Segment=1
Zone=1, Track=0, Segment=0
026AFEh
026AFFh
026AE5h
026AE6h
026AE7h
026AE8h
026AE9h
026ACCh
026ACDh
026ACEh
026ACFh
026AD0h

FIG. 27

View explaining data structure in lead-in area of write-once type information recording medium

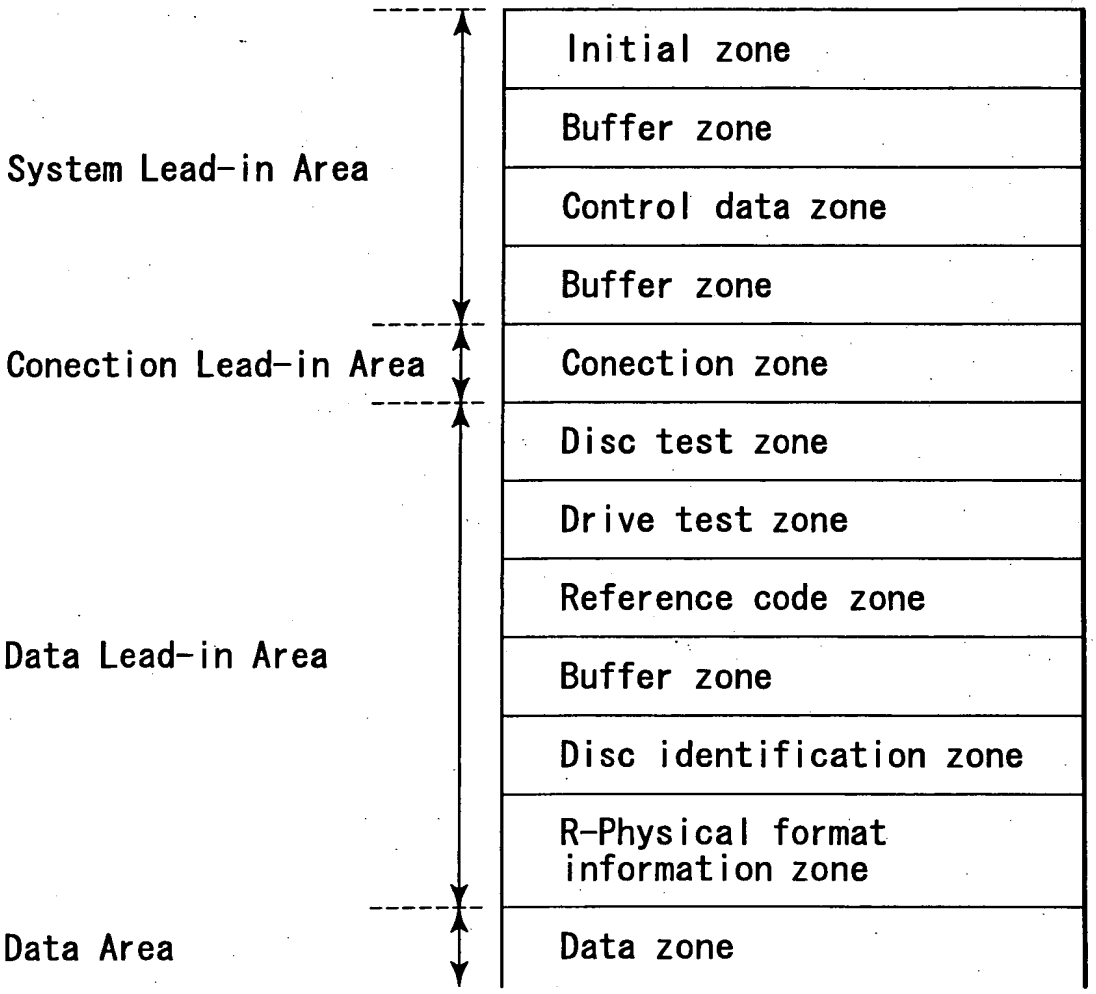


FIG. 28

Signal detection/signal evaluation circuit (R) used to reproduce signal in system lead-in area

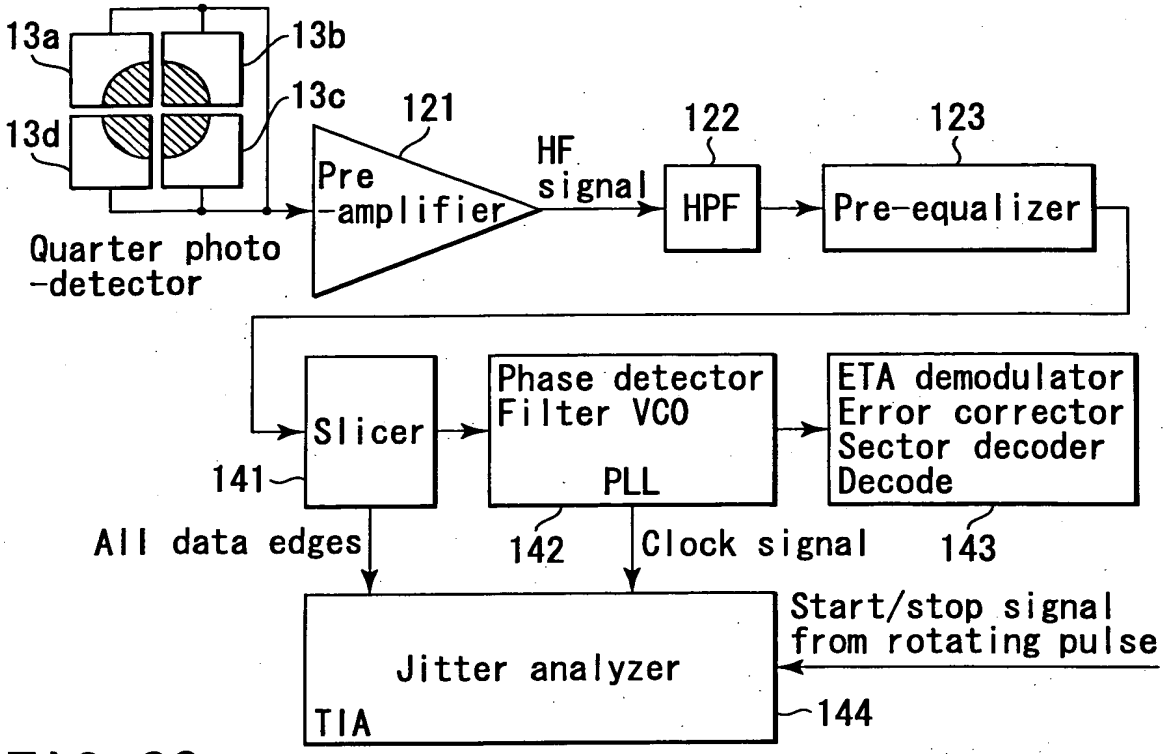


FIG. 29

View explaining structure of slicer circuit used to reproduce signal in system lead-in area

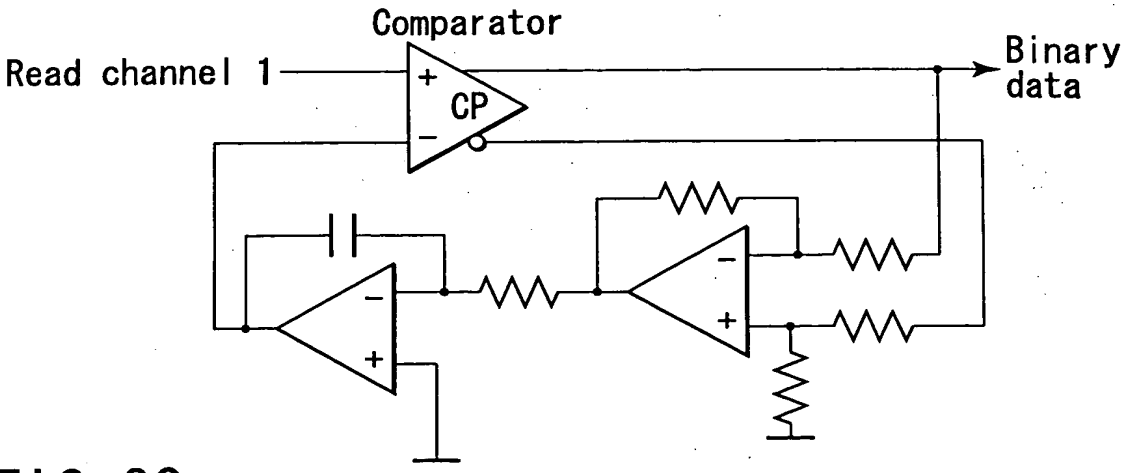


FIG. 30

View explaining detection circuit used to detect signals in data lead-in area, data area, and data lead-out area

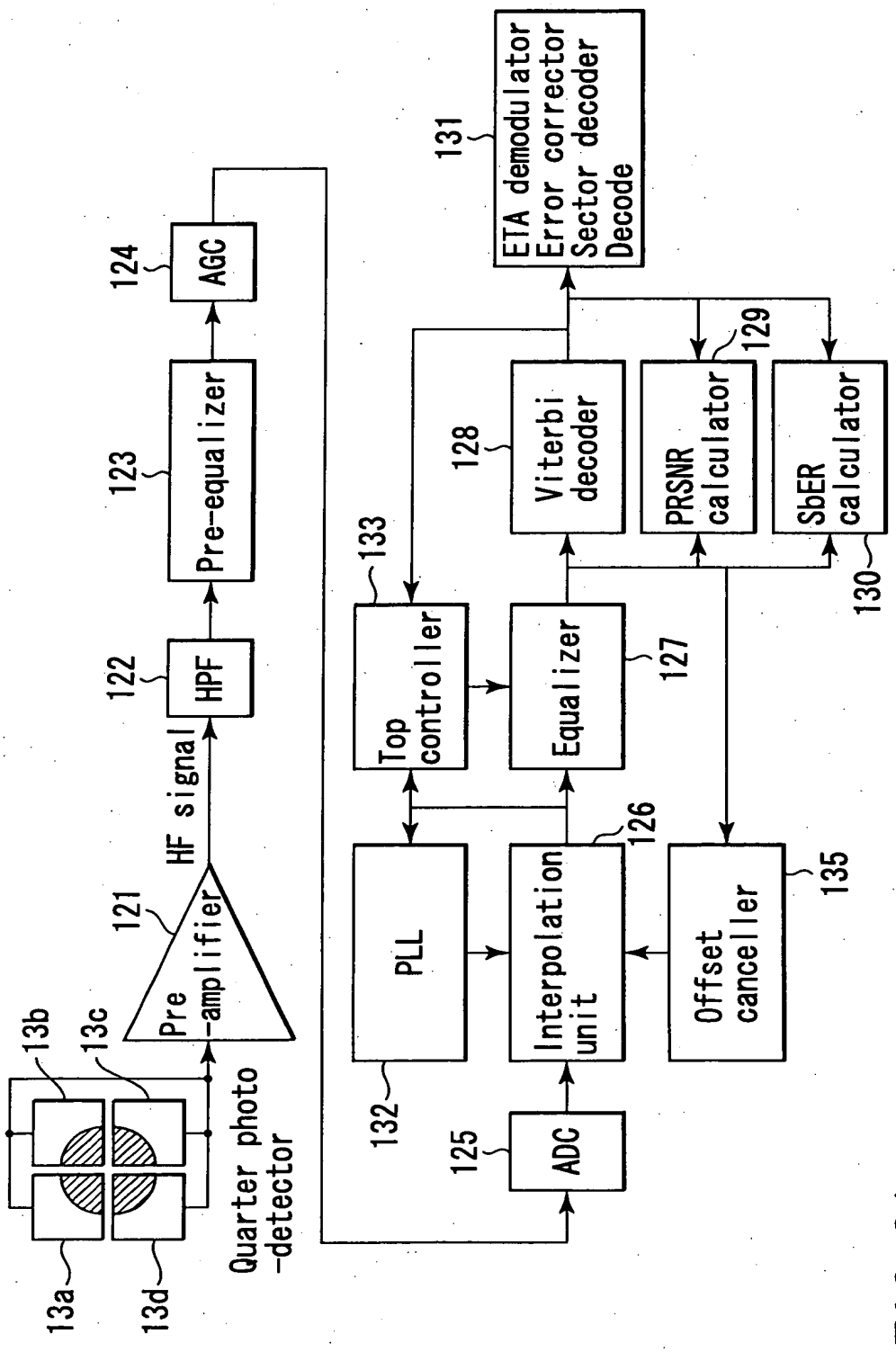


FIG. 31

View explaining structure in viterbi decoder

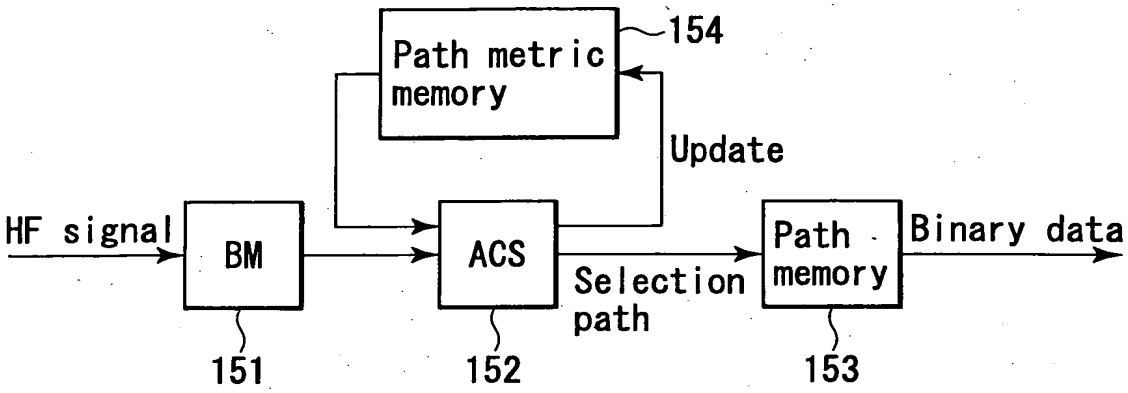


FIG. 32

View explaining transition state of pr(1, 2, 2, 2, 1)channel Combined with ETM code

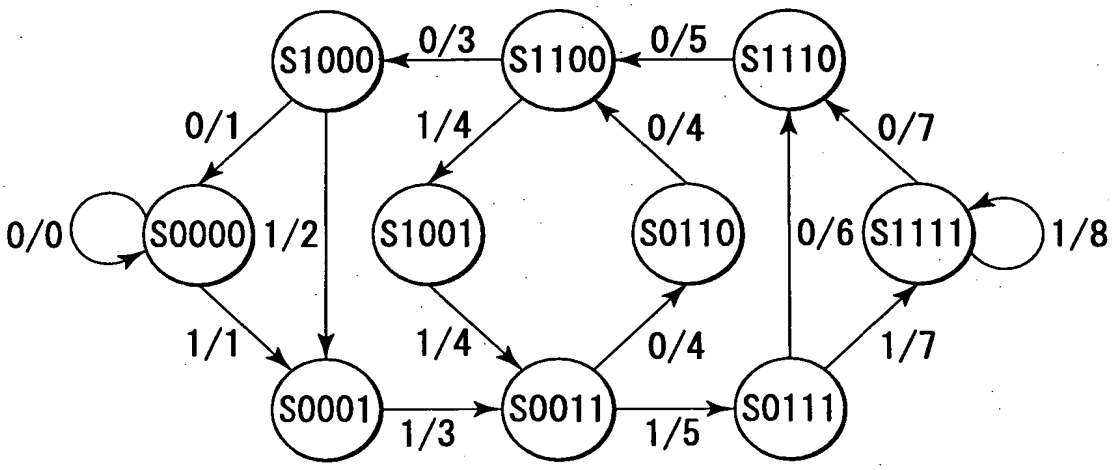


FIG. 33

View explaining path memory

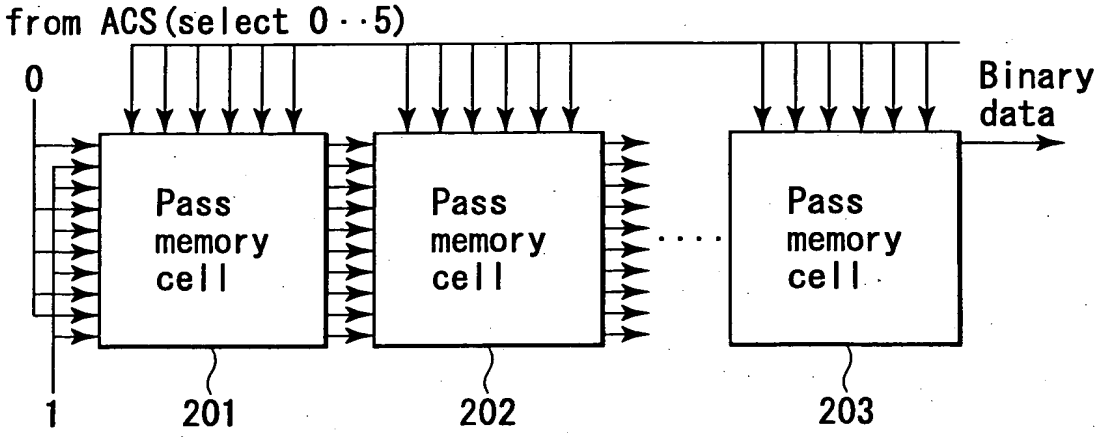


FIG. 34

View explaining I/O of path memory cell

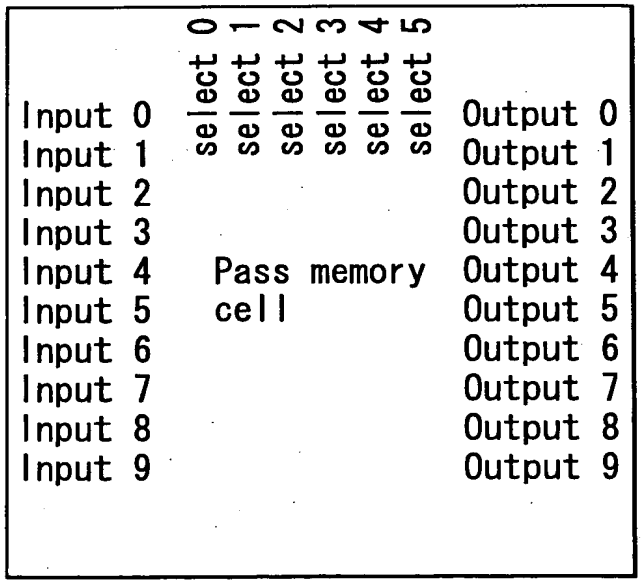


FIG. 35

View explaining configuration of path memory cell

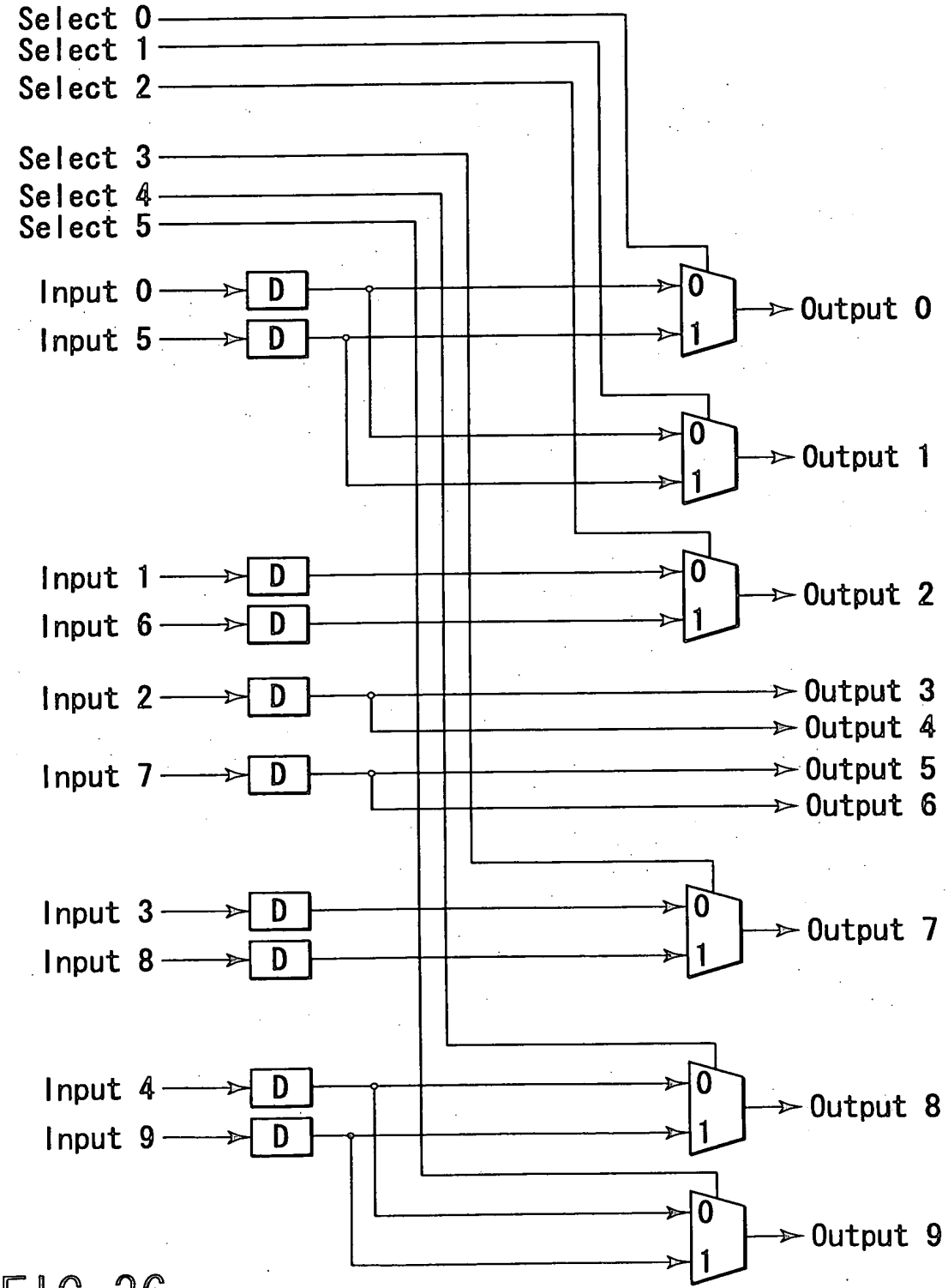


FIG. 36